DEFINING SUCCESS FOR DATA PROCESSING

A practical approach to strategic
planning for the DP department

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Introduction*

There is a plethora of complaints and admonitions concerning Data Processing; what it should do and will be. Unfortunately, most of these "discussions" focus on one DP function or service at a time, leaving each out of context. Consequently, trade-offs between DP functions are not explicitly addressed and relative priorities for resource allocation are not established. Amidst this heated discussion, user and DP managers look to each other in vain for policies and priorities.

Consequently, the six companies studied are violating the most fundamental rule of management -- identify which activities are most important and allocate resources to ensure good performance on those activities. This study identifies important activities, measures performance on each activity, and prioritizes management attention for improvement. Moreover, the approach used in this research is adaptable by companies as a practical foundation for DP strategic planning.

In most other functional areas, finance or manufacturing for example, we have a good understanding of what constitutes success. Consequently we can and do measure performance in various ways, assess strengths and weaknesses, set revised objectives, and reallocate resources as necessary. I think equivocation on strategic planning for DP is primarily due to the

lack of an integrated understanding of what constitutes success for DP. Defining success is the basic prerequisite to performance measurement, determining priorities for improvement, and strategic planning.

Unfortunately, the definition of success for DP is a moving target. DP is being driven by dramatic growth in demand for new application systems of more diverse types[1]. Past successes have raised managers' aspirations to ever higher levels of information availability and analysis. Increasing corporate data resources, continuing improvements in technology, and growing DP literacy among user managers are all occurring simultaneously.

A continual process of defining and measuring DP success is necessary to meet this challenge. We must identify relevant, current and emerging, DP functions and prioritize them. And we must continually measure performance in order to modify policies and procedures, shift managerial emphasis, and allocate scarce resources.

In short, industry needs a strategic planning process for DP which is strongly linked to users' needs and corporate planning. Three major impediments are frequently encountered when using the currently available approaches:

1. the strategic planning process itself

2. lack of a corporate strategic plan

3. indeterminate implications of corporate plans for DP

Several strategic planning methodologies are available; however, all are predicated upon an integrated definition of success. Every strategic planning process is itself content-free. It is the responsibility of management to define success. As too many DP managers already know,

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[1] "User Managers' System Needs," Robert M. Alloway, CISR Working Paper, forthcoming.

without an integrated definition of success, the outcome of attacking an enormous complex planning problem with a content-free process is inevitably inadequate.

Unfortunately, not all Chief Information Officers[*] have access to explicit corporate strategic plans. In many cases this is simply because such plans do not exist. In others, the CIO is not a regular member of the informal senior management discussions which evolve implicit strategies. In some, the CIO is not privy, by omission or commission, to existing explicit plans because of their critical, proprietary, competitive nature.

Even when the CIO has access to explicit corporate strategic plans it is seldom easy to divine a collateral supporting DP strategy. Qualitative, facilitative, and enabling benefits dominate the interpolation and translation into DP goals. Opportunity recognition requires intimate knowledge of current user activities possessed only by user management. Heavy participation by senior user managers is necessary to resolve priority and resource allocation trade-offs. Total DP budgets for combined user and DP efforts must be balanced against goals, personnel availability, technological trends, and organizational feasibility.

Moreover, the entire DP planning process should be quick and efficient enough to be performed/revised annually without overburdening scarce management time. Few companies have been able to develop linked corporate and DP strategic planning procedures both effective and efficient enough to overcome these impediments.

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[*] The head of DP will be referred to as the Chief Information Officer (CIO) because so many different titles are used in practice.

Undaunted, DP and user management has achieved tremendous progress. The typical manager regularly uses 3 to 4 systems for access and manipulation of information, most of which was previously quite cumbersome, uneconomic, or simply unavailable.[2]

DP planning does result in projected budgets, manpower requirements, and planned hardware configurations. Decisions on specific projects are made in light of corporate ROI, user departmental priorities, and 3-5 year systems plans. All of which is desirable but is not a strategic plan for DP. The potential for improved effectiveness of DP efforts through a practical approach to DP strategic planning is worth pursuing.

This article discusses the results of a survey of user and DP managers which provides the specifics for planning -- an integrated definition of success, assessment of strengths and weaknesses, identification of key problems, and, based on the results, recommended priorities for action.

The results from the six firms studied are probably applicable to your firm but, even if you feel they are not, this paper provides a concrete point of departure and a specific diagnostic methodology which works. The advantages of this approach are its procedural independence from corporate strategic planning, strong linkage and translation of user needs to DP planning, and minimal time/effort required. The key disadvantage is its deceptive simplicity and potential for misuse -- yielding misleading results for those who lack experience and expertise in quantifying subjective managerial opinions using questionnaire measurement techniques.

[2]"User Managers' Systems Needs", Robert M. Alloway, CISR Working Paper, forthcoming.

Research Method

Identification of criteria on which to measure success began with extensive discussions and "blue-skying". The resulting list was impractically long and dominated by technical/operational criteria. Anthony's[3] partitioning of strategic, managerial and operational activities was used to balance and shorten the list to 26 criteria. I make no claim that this list is exhaustive or optimal, but it is a good start. See Exhibit 1 for a list of the 26 criteria.

Next, I needed importance and performance ratings for each criteria from many managers. As part of a larger research project[4], 114 DP and user managers in 6 diverse manufacturing firms completed an extensive questionnaire. Respondents were selected to be a stratified sample of senior, middle and junior managers from the DP, Finance and Manufacturing departments. See Exhibits 2 and 3 for firm and respondent profiles.

Every manager rated each of the 26 criteria on two separate questions -- one for importance and one for performance. Relative importance was used to weight performance when calculating success for DP and when computing success for each of the 26 criteria. Because every manager is known by name and organizational role, comparisons between managers and departments were easily made on individual criteria, groups of criteria, and overall success.

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[3] Planning and Control Systems, Robert N. Anthony, Harvard Business School, 1965

[4] "User Needs Survey: Preliminary Results," Robert M. Alloway, et al, Sloan School of Management Working Paper, 1096-79, December 1979.

Is there a DP success problem?

Overall DP success is mediocre. Measured on the seven point scale in Exhibit 4, average success is only 4.1 for the 6 firms. It is naive to expect DP success ratings of 7 (excellent), but 5 (good) should be realistic; whereas 4 is teetering, most firms have a major DP shake-up before 3 (inadequate) is reached.[5]

Yes, there is a real problem in DP success. These results are not a surprise but certainly a cause for concern.

DP managers, naturally, rated their departments higher, 4.4, than user managers, 4.0, but nonetheless they basically agree. Things are not "good", 5.0, and definitely not "excellent", 7.0. There is considerable incentive, across the board, to address the definition of DP success and its improvement.

Firm differences in overall success are large, ranging from 3.5 to 4.8. More importantly, firm differences in users' ratings of DP success are even larger, ranging from 3.2 to 4.8. Talking to user managers in these two firms is the difference between night and day. Firm 5 at 4.8 still has ample room for improvement but improvements are possible, supported, and underway.

On the other hand, Firm 3 is in real trouble, not only because of low user success ratings, but also because of the large difference between DP (4.0) and user (3.2) success ratings. A large difference between DP and user ratings makes problem recognition and cooperation for improvement

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[5] Firm 3, for example, underwent a fundamental transfer of responsibility away from DP almost concurrent with our data gathering.

significantly more difficult. The management of firm 3 decided it was necessary to completely restructure DP in order to overcome this barrier to improvement.

Firms 1 and 6 also have large differences between user and DP success ratings, 5.1 to 4.4 and 4.6 to 3.6 respectively. Without common problem recognition and cooperation, DP and users become entrenched in attack-defense efforts thereby stagnating improvement until success becomes so low a radical restructuring of DP is finally forced.

Common knowledge recognizes a widespread problem with DP success, user dissatisfaction, and important differences in DP success among firms. This research confirms this DP problem with empirically measured importance and performance on 26 criteria integrated into an overall definition of DP success. This alone is a significant contribution.

The real contribution, however, derives from what can be learned by dis-aggregating overall success. For the first time, within an integrated definition of DP success we can dig deeply into patterns of strengths and weaknesses, compare firms, deal with trade-offs between criteria, and search for the causes of low success.

What are DP's strengths and weaknesses?

In order to diagnose causes of low success we must begin with identification of major areas of strength and weakness. This was accomplished by focusing on users' average ratings of DP success, and grouping the 26 criteria to differentiate between areas of relative strength and weakness.

Cynical opinions notwithstanding, user managers are quite capable of differentiating among various DP functions. Exhibit 1 lists average users' success ratings for each criteria. The range of success across the criteria is even greater than the range in firm success. Good success (5.0) on criterion H (technical competence of the DP staff) is significantly different from inadequate success (2.7) on criterion D (training programs for users in DP capabilities). Users can and do recognize criteria where DP is successful and distinguish those from other criteria where it is not. All DP activities are not "tarred with the same brush" by the user managers studied.

The 26 criteria were clustered into the 8 groups in Exhibit 1 based on common patterns in user managers' performance ratings.[6] Users conceptually group like DP activities together and distinguish between management/process problems, user relations, and ongoing daily activities. This makes a significant point. Users understand DP activities well enough to differentiate among them. User managers' opinions are not naive or unrelated to the realities of DP. Users opinions are a valid source of relevant importance and performance information for diagnosis and planning.

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[6] Obviously, the 26 criteria have been rearranged from the original questionnaire. A product-moment principal factor analysis was used for grouping.

The managerial, effectiveness-oriented groups of criteria (e.g. Development and User Relations) are less successful from the users' point of view than the traditional, efficiency-oriented groups (eg. Technical and Operations). According to these user managers the essence of effectiveness improvement in DP is the development of _more_ managerially-oriented application systems. This necessitates better user communications, training, responsiveness, and attitudes as well as supporting proposal preparation, improving the systems development process itself, and restructuring the systems development backlog.

Do strengths and weaknesses vary by Firm?

I expected the patterns of strengths and weaknesses to be significantly different between high and low success firms. The hypothesis was that high success DP departments would do well on both efficiency and effectiveness criteria, whereas, the pattern for low success DP departments would be good efficiency but poor effectiveness. This, however, is not what the data says.

Firms 3 and 5 were selected to contrast the differences between high and low success firms using the eight groups of criteria identified in Exhibit 1. Refer to Exhibit 5 for user success ratings by group for these two firms. Firms 3 and 5, with overall success of 3.2 and 4.8 respectively, have the same basic pattern of strengths and weaknesses -- only the levels differ. Both firms have the same relative strengths in efficiency and weaknesses in effectiveness.

This pattern holds for all six firms studied. From the researcher's point-of-view this common pattern of strengths and weaknesses turns out to

be fortuitous. One set of recommendations for improvement will apply to all six firms and it lends credibility to generalizations to other firms.

Average user ratings of DP success by criteria show a pattern of relative strength in efficiency and weakness in effectiveness. All six DP departments studied have this same pattern of relative strengths and weaknesses. This is a terribly helpful diagnosis, a description of relative success patterns by criterion and firm. It is not, however, the identification of the causes for low success. For causes we must dig deeper, further dis-aggregating success in a search for causes of low success.

The commonly acknowledged and often discussed communication problems between users and DP suggest three possibilities for search: disagreements between users and DP on relative success, importance, and/or performance on the criteria for success.

Do users and DP agree on success by criteria?

Surprisingly, DP and users agree on the success of each of the 26 criteria. Exhibit 6 plots DP versus user success ratings on each criteria. If either users or DP disagreed on any criteria, it would be plotted far from the diagonal. Notice how the user and DP success ratings for all of the 26 criteria are tightly grouped along the diagonal. Clearly, disagreements over success are not the cause we are searching for; however, this exhibit is packed with insightful information -- both alarming and hopeful.

Alarming, because the top of the "ladder to success" is empty. DP and users agree -- nothing even approaches "excellent", and only technical competence (H) barely makes the "good" rung on the ladder. The bulk of the criteria fall in the caution zone between the scale's midpoint and "good"; they could go either way. Seven of the criteria fall below the midpoint in the clear danger zone and one, D, is universally recognized as below "inadequate".

Exhibit 6 is also hopeful. The necessary prerequisite for improvement, co-joint clarity of problem identification between users and DP, is fulfilled. This excellent agreement between DP and users cuts through a lot of the heated debate and allows interested parties to progress to the next level of discussion -- problem causes and how to fix them.

However, all DP managers are not equally convinced there is a severe problem nor do all DP departments and users have such excellent agreement on success. Exhibit 4 shows some material differences between DP and user success ratings, firm 6 for example at 4.6 and 3.6 respectively. Moreover,

the plots of DP versus user success ratings for each firm (not shown for lack of space) indicate that some convincing is still necessary especially in low success firms. The higher the overall success rating, the better the agreement between DP and users on the success of each criteria. The less successful firms face a preliminary task, refining co-joint agreement on problem identification. The gap between high and low success firms will continue to widen unless low success firms cease their entrenched attack-defense efforts and redirect their efforts to diagnosis and cooperative improvement.

Is it importance or performance?

Ratings for importance of each criteria for DP versus users is plotted in Exhibit 7. Again all 26 criteria are tightly grouped along the diagonal. This dispels the possibility that low success results from user-DP disagreements over importance. There is excellent agreement on the relative importance of all 26 criteria! This does not, of course, imply that these importance ratings are "right" or do not evolve. It does imply that user managers' opinions of the relative importance of the macro level DP criteria studied are just as "right" as DP's.

The plot of DP versus user ratings of performance on each criteria (not shown for lack of space) reveals similarly excellent agreement. With each succeeding agreement between DP and users on success, importance, and performance, the credibility of user opinions has been enhanced. The quality of user understanding of DP managerial issues, which has been revealed in Exhibits 6 and 7, is impressive and potentially beneficial to both DP and the whole firm. User management is capable and clearly should participate in the managerial process of diagnosis and planning for the 26 criteria studied.

So far, we have identified 26 criteria, measured their importance and performance, developed a simple but reliable integrated definition of DP success, revealed the efficiency/effectiveness pattern of strengths and weaknesses by criteria for all six firms, and searched for the cause of low success.

Three possible causes of low success have been checked and rejected. DP and users agree on success, importance, and performance for all 26 criteria. The quality and consistency of this agreement is surprising given all the "discussions" about unknowledgeable users, unresponsive DP, and DP-user communication problems. The question remains; what is the cause of low success?

Found: the cause of low success

The cause of low success is fundamental and straightforward -- user managers see absolutely no relationship between importance and performance! Exhibit 8 plots users' ratings of importance and performance for each criteria. These criteria should all lie on the diagonal. Instead, there is no managerially justifiable pattern, or any pattern for that matter; it resembles only a random shotgun pattern.

The most basic managerial rule, allocate resources to perform well on the most important tasks, is clearly being violated. Equally important criteria, D and B, have performances ranging from good to inadequate. Equal performance results are achieved on criteria Z and W with importances ranging from indifferent to high.

Exhibit 9 plots DPs' ratings of importance versus performance for all 26 criteria. This preempts the argument that the users' perceptions displayed in Exhibit 8 are, to put it politely, inaccurate. Again, these criteria should all lie on the diagonal. DP managers also fail to detect any managerially justifiable relationship between importance and performance. The imbalance between importance and performance is definitely the fundamental cause of low success.

Consider for example, the development of monitor, exception, inquiry and analysis type systems (criteria J, K, L and M).[7] The more traditional/

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[7]For a complete discussion of system types, their growth rates, managerial appropriateness, and levels of demand see "User Managers' Systems Needs", Robert M. Alloway, CISR Working Paper, forthcoming.

efficiency-oriented the system (J and K), the lower the importance but the higher the performance. Conversely, the more managerial/effectiveness-oriented the system (L and M), the lower the performance but the higher the importance. These four points nearly form a straight line sloping downward to the right. The greater the importance the lower the performance! Exactly the opposite of the relationship we should see.

Obviously it is time to shift management's attention and reallocate scarce resources to close the gap between importance and performance. But, where should we begin?

What hurts the most?

DP and user managers in these six firms could significantly improve success if they conducted an indepth diagnosis of their importance-performance gaps and prioritized their reallocation of resources to improve performance on highly important criteria. This can be done with the approach to defining DP success used in this research.

Exhibit 10 returns to firm 5 for an example indepth diagnostic of the importance-performance gap at the firm level. The location of the axes at 5 and 5 (good and important) is somewhat arbitrary, but I have tried to choose achievable standards. The upper-right corner is the relative "success" quadrant. This implies no change is necessary in importance-performance for these criteria. The lower-left quadrant is also "OK" in the sense that lower performance on these comparatively unimportant criteria is acceptable.

My recommendation for these two quadrants, leave them be, might appear much too benign until one contemplates the level of managerial

attention and effort required to improve the lower-right quadrant.

The lower-right quadrant is the real "killer". These criteria have high importance but low performance. These are the criteria which ruin a DP department's reputation, drive users up the wall, seriously impair DP's ability to deliver, and prevent user managers from receiving their relevant information.

The upper-left quadrant should receive declining management attention. Any increased efforts to improve performance here are a relative "waste" of resources. Clearly DP management should not steal resources from the "success" quadrant for use in the "killer" quadrant, rather, DP should reallocate from "waste" and "OK" to "killer."

DP in firm 5 has a good operations group (X,W,B,C and Z) and traditional technical competence (J,F and H). In fact, they are over-performing, in the "waste" quadrant, on one criteria (J and Z) in each group. Given scarce DP resources, the leverage for improved overall success definitely lies elsewhere, in the "killers", in managerially oriented new systems development (L and M) to achieve responsiveness to user's needs (O) and improve users attitudes (G). This necessitates training programs for users (D) and support for users in proposal preparation (U) for needs recognition and project practicability. Moreover, senior user managers must be more involved (N), the new systems development process itself needs improvement (S), and systems analysts need more knowledge of users' operations (T) for prioritization and successful implementation.

In short, a complete reassessment of the systems development activitiea (policies, portfolio balance by system type, systems development procedures, user training programs, and systems analysts' skills) is needed to make them more user management oriented.

Each firm is, of course, unique with its own special needs implying importances and, equally critical, its own profile of performance. Firm 3 (see Exhibit 11) both differs from and is similar to Firm 5. The most noticeable difference is lower success on nearly all criteria (3.2 average success vs 4.8 for firm 5) reflected in a virtually empty "success" quadrant and an overwhelming "killer" quadrant. The magnitude of change required is simply impractical if all "killer" criteria are addressed simultaneously.

As mentioned previously, the location of the axes (solid lines) at 5 and 5 is arbitrary -- so we can easily customize for firm 3's average performance (dashed line). This enables firm 3 to focus on a smaller, more practical subset of improvement efforts.

When firm 3 has improved its current "killers", they will be replaced by others. Their firm relative performance standards (dashed line) will move. Defining success, assessing importance-performance, and mounting efforts to improve is a basic, recurring managerial task.

Priorities for Action

Given the _excellent_ agreement between DP and users we have seen and
the consistency of the patterns across all six firms, generalizations of
action priorities for these six firms are reasonable.

Improvements in DP should begin with those criteria having the
largest differences between importance and performance. Moreover, it will
be significantly easier to achieve improvements on a particular criteria if
both DP and users agree on the relative size of its importance-performance
difference.

Exhibit 12 depicts these importance-performance differences between
DP and user managers in all six firms. The greater the difference, the
greater the priority for action. Fortuitously, DP and user managers have
excellent agreement on these differences for all 26 criteria.

Beginning with the upper-right corner, the top three priority
clusters can be identified. Ironically, the top priority improvement for
DP is to develop a general education program in DP for user managers (D).
It would seem logical for this program to focus heavily on the criteria in
the other two top priority clusters.

Three criteria in the second priority cluster are more like outcomes
than inputs -- perceived responsiveness (O), communication (A) and user
attitudes (G). Improvements in the other top priority criteria should
favorably affect these criteria. They can also be directly addressed by
explicitly allocating more DP management time to communicating with user
managers. The fourth criterion in this cluster (M) is the development of
more analysis systems. This type of application includes planning/what-if,

statistics/forecasting, simulation/optimization, and Decision Support Systems.[8]

The third priority cluster includes the other managerial system type, flexible inquiry systems (L). These systems allow user managers access, either personally or via an intermediary, to ad-hoc and flexible reports on an as-needed basis. The potentials of currently available database management systems and user query languages should be aggressively pursued.

This has a synergystic effect with cleaning-up current report contents (Y). There should be minimal problems with outdated report contents from flexible inquiry systems; as users' needs change, users modify their report contents accordingly. Moreover, the maintenance workload on output reports should decline as traditional monitor (J) and exception (K) systems are converted to flexible inquiry (L). Cleaning up report contents on unconverted applications is a DP "budget-eater" but according to these results should not be downplayed. Rather, management attention to the maintenance process should be invested to improve it.

Improving the systems development process itself (S) is an enabling requirement for all applications and especially for creating more inquiry (L) and analysis (M) systems. To date, considerable time and money has already been expended on improving the systems development process with modest and sporadic results. A fundamental flaw in these efforts has been to design the one project procedure appropriate for all systems. This has

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[8] see Decision Support Systems, Keen and Scott Morton, Addison-Wesley, 1978 and "Decision Support Sytems and Information Flows in the 1980's", Robert M. Alloway, Teleinformatics 79, North-Holland Publishing, 1979.

resulted in project procedures appropriate for monitor and exception systems (90% of the installed base) and inappropriate for inquiry and analysis systems (40% of new systems demand).[9] The key here is to recognize the fundamental differences in system types and develop project procedures appropriate for each -- maintenance, transaction processors (monitor and exception), inquiry, and analysis.[10]

Note the cross-functional skill development implied by user education in DP (D) and DP education in user functions (T). For both sides, this is supplemental to skill development programs in their own function. Identification and prioritization of skills, effective communication of these priorities, and corresponding modification of personnel evaluation/reward systems is necessary for success in these efforts.[11]

Defining success for DP is an ongoing process, necessitating re-assessments of the relative importance of alternative criteria to user management. This requires the involvement of senior user managers in DP policy formulation and evaluation (N). Many managers have mixed feelings about the effectiveness of DP steering committees. Perhaps, with some of the meaty issues raised by defining success for DP, steering committees would have more impact than serving as project progress reviewers.

These ten top priority criteria are mutually complementary except that they compete with each other for management attention and resources. They can be categorized as in Exhibit 13 and perhaps addressed by different sub-groups within DP.

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[9] "User Managers' Systems Needs", Robert M. Alloway, CISR Working Paper, forthcoming.

[10] "Temporary Management Systems", Robert M. Alloway, CISR 1978.
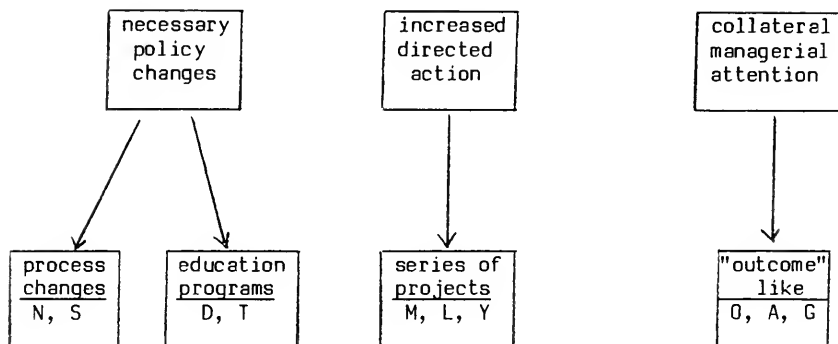
[11] "Grow Your Own: Skill Planning, Development, and Reward for Systems Analysts", Robert M. Alloway, Datamation, April 1980.

Exhibit 13

Categorization of Improvement Efforts by Type

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┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│  necessary  │        │  increased  │        │  collateral │
│   policy    │        │  directed   │        │  managerial │
│   changes   │        │   action    │        │  attention  │
└─────────────┘        └─────────────┘        └─────────────┘
     │    ╲                    │                      │
     │     ╲                   │                      │
     ▼      ▼                  ▼                      ▼
┌─────────┐ ┌───────────┐ ┌─────────────┐      ┌─────────────┐
│ process │ │ education │ │  series of  │      │  "outcome"  │
│ changes │ │ programs  │ │  projects   │      │    like     │
│  N, S   │ │   D, T    │ │   M, L, Y   │      │   O, A, G   │
└─────────┘ └───────────┘ └─────────────┘      └─────────────┘
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There is much more information contained in these exhibits than space permits discussing in detail. The reader is invited to select his/her favorite criteria from Exhibit 1 and trace them through the other exhibits. The fundamental conclusions from these exhibits, however, have been discussed.

Summary and Recommendations

The recommendations presented in this paper are for the sample of six firms studied. This is a sound piece of research with clear, emphatic results, however, generalizations from this or any research should be approached with caution. Only six firms were studied -- all in the industrial sector. Only a stratified sample of managers in finance, manufacturing and DP were included. Respondents were required to quantify their subjective opinions in a questionnaire. The 26 criteria used to define and measure success are not exhaustive.

Strategic planning for DP must be predicated upon some definition of overall, integrated success. Setting objectives, determining priorities, and re-allocating resources is fundamentally based upon a diagnosis of differences between actual and desired.

In this research, performance and importance represent actual and desired for each criterion. Combined into an index of success the severity of the problem can be gauged by firm, department, hierarchical level, or criterion. Disaggregated, diagnoses of cause can be made and priorities for improvement assigned. The flexibility to perform resource trade-off analysis at the aggregate level or causal diagnosis at the dis-aggregated level is inherent in this integrated approach to defining and measuring success.

The results of this study are dramatic and clear, but require material shifts in managerial attention and resource allocation. Considerable cooperation from the right people is necessary to address performance improvements on the top ten priority criteria identified. If you or "necessary others" are not convinced of the applicability of these results to your firm, then you must customize and repeat this exercise -- define success, measure it, identify problem causes, and prioritize necessary improvements. The process chosen to accomplish these steps in the planning process is very important. It should yield measureable specifics, be easily understood, and practical enough for annual measurements. It is quite practical to use a customized version of the approach used in this research for diagnosis, DP strategic planning, and prioritization of improvement efforts.

The next steps in the planning process vary somewhat based upon the results of the preceeding steps. For these six companies, for example, it

is not necessary to convince DP there is a problem, to develop agreement between DP and users on criteria with low performance, or to reconcile differences in importance ratings of various criteria between DP and users*.

Achievable objectives must be determined for each criteria and the overall improvement effort. This is an iterative process of assessing the levels of improvement possible given various levels of available resources. It is important to also consider the interrelationships between criteria for possible precedence relationships and workload impact on the personnel involved as in Exhibit 13.

Strategic planning for DP is clearly necessary and definitely the responsiblity of both user and DP management. In the abstract a strategic planning process is easy to specify. In the specific, most firms do not follow this process because it is essentially content-free and dependent upon the specificity of corporate strategic plans and their indeterminate linkage to DP activities.

The process for defining DP success used in this research suggests a practical, concrete, understandable method to perform the necessary first steps in strategic planning for DP. Based upon the results of this sample, it is undoubtedly time to define DP success at the firm level, diagnose causes, and assign priorities for improvement.

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*This is truer for the six collectively than for some firms in particular. The lower the users' ratings of success, the greater the need for improving co-joint problem definition.

Summary of Results

* There is a problem in DP success, it is widespread and severe. DP and user managers have excellent agreement on the relative success of the 26 criteria studied.

* The pattern of relative strengths and weaknesses is the same for all firms. Moreover, there is excellent agreement between DP and users on this pattern.

* Relative strength exists in technical, operational, efficiency-oriented criteria. Development of new managerial systems, user relations, and the managerial effectiveness-oriented criteria are comparatively weak.

* The heart of the problem lies not in importance or performance disagreements between users and DP, rather in the more basic imbalance between importance and performance. Both DP and users fail to detect any desirable or justifiable relationship between importance and performance on the criteria for success.

* There are too many areas of desired improvement for the scarce resources available, especially management attention, to sufficiently address them all simultaneously. Priorities for action can be determined by the basic cause of low success -- gaps between importance and performance. Large importance-performance gaps on ten criteria have been identified with excellent agreement between DP and user management.

Summary of Recommendations

* The process chosen for DP strategic planning is critical. It must strongly link corporate needs with DP functions or criteria, provide an integrated definition of DP success, and be practical enough for annual planning.

* Based upon an integrated definition and measurement of success, areas of needed improvement should be identified, agreed upon, and prioritized. Resource availability and co-joint responsibilities in improvements should be carefully considered.

* Objectives must be set for each prioritized criteria and the overall improvement effort. Plans should include reaching out for fresh inputs, possible precedence relationships between criteria, available resources, impacts on involved personnel, and the organization's capacity for change.

* The progress of improvement efforts should be monitored, resources reallocated as necessary, and a practical process for annual re-definition and measurement of success instituted.

DP is both too expensive and too critical for mis-allocated improvement efforts. Defining success for DP is a necessary first step in strategic planning for effective improvement of DP.

Exhibit 1
26 Criteria of DP Success

Success[*]   Group and Criteria

    Technical
4.7   J.   developing more monitor systems
4.6   F.   quality of DP systems analysts
5.0   H.   technical competence of the DP staff
4.8

    Security
4.7   E.   data security and privacy

    Operations
4.4   X.   running current systems (costs, ease of use, maintenance)
4.4   W.   availability and timeliness of report delivery to users
4.7   B.   efficiency of hardware utilization
4.3   C.   hardware and systems downtime
4.6   Z.   DP profitability from user billbacks and billable time ratios
4.4

    Proportion
4.5   R.   sophistication of new systems
4.1   Q.   increasing the proportion of DP effort expended in creating new systems
4.3

    Cost/Direction
4.2   P.   overall cost-effectiveness
3.7   N.   involvement of senior users in DP policy formulation and evaluation.
3.9

    User Relations
3.6   T.   user oriented systems analysts who know user operations
4.0   V.   appropriate DP budget size or growth rate
4.0   A.   communication with managerial uses
3.8   O.   responsiveness to user needs
3.8   U.   DP support for uses in preparing proposals for new systems
3.8

    Development
4.2   Y.   report contents (relevance, currentness, flexibility, accuracy)
2.7   D.   Training Programs for users in DP capabilities
3.8   G.   attitudes of users to DP
4.0   K.   developing more exception systems
3.3   L.   developing more inquiry systems
3.2   M.   developing more analysis systems
3.5

    Backlog/Process
3.3   I.   the new system request backlog
3.7   S.   improving new system development (time, cost, quality, disruptions)
3.5

* Average success rating for all user managers.

Exhibit 2
Profile of Manufacturing Firms Surveyed

Firm	Industry	Sales* (000,000)	DP Budget* (000,000)	DP% Sales*	Respondents
1	equip Mfg	110	2.2	2%	11
2	analog elec	50	1.0	2%	34
3	diverse mfg	240	2.4	1%	16
4	chemical	65	0.5	0.8 %	16
5	aerospace	700	5.5	0.8 %	12
6	digital elec	67	0.36	0.53%	25
					114

*not parent corporation, within boundary of user community or division studied

Exhibit 3
Profile of Survey Respondents

Level*	DP	Mfg	Fin	Total	Average Salary ($000)
1	6	5	4	15	44
2	3	11	12	25	31
3	9	21	9	39	25
4	15	13	6	34	20
total	33	50	31	114	
response rate	97%	91%	89%	92%	

*hierarchical level within user community
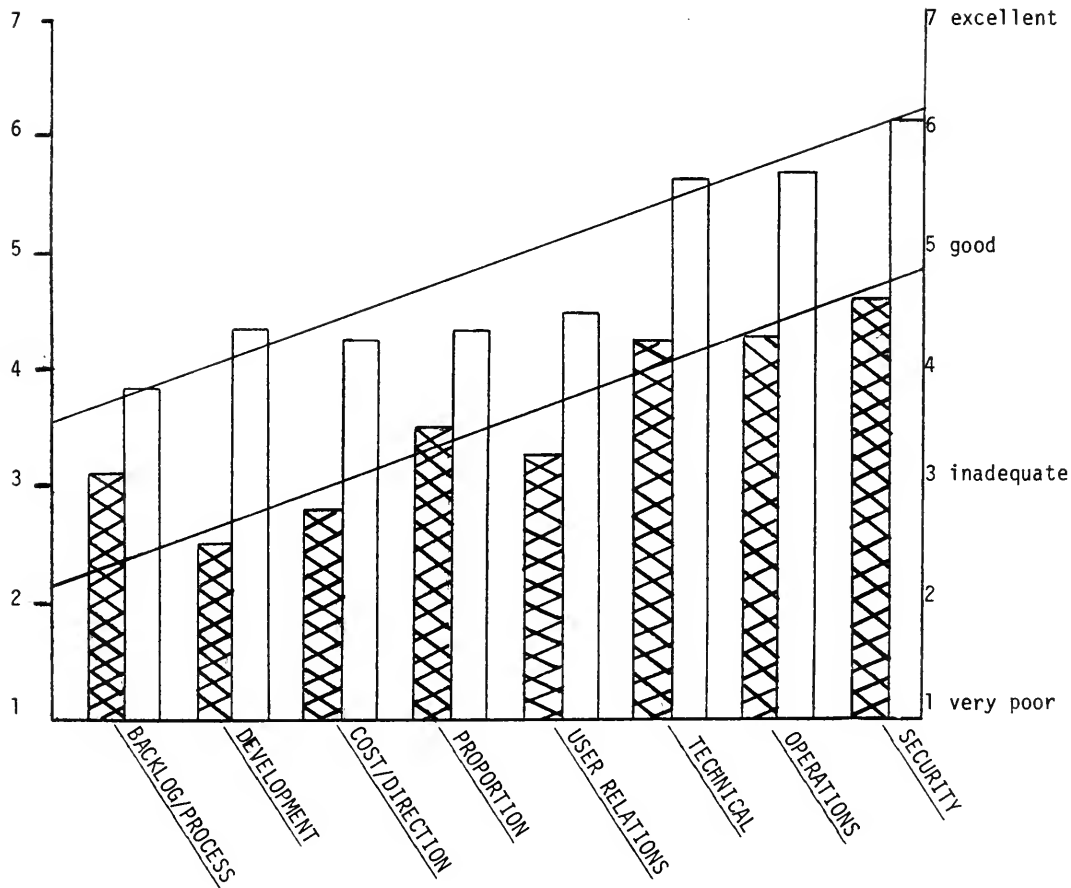
Exhibit 4
Ratings of Overall Success in DP

very poor		inadequate		good		excellent
1	2	3	4	5	6	7

Firms	1	2	3	4	5	6	Average
DP Managers	5.1	4.3	4.0	4.0	4.4	4.6	4.4
User Managers	4.4	3.8	3.2	4.1	4.8	3.6	4.0
Overall Success	4.8	3.9	3.5	4.1	4.7	3.8	4.1

EXHIBIT 5

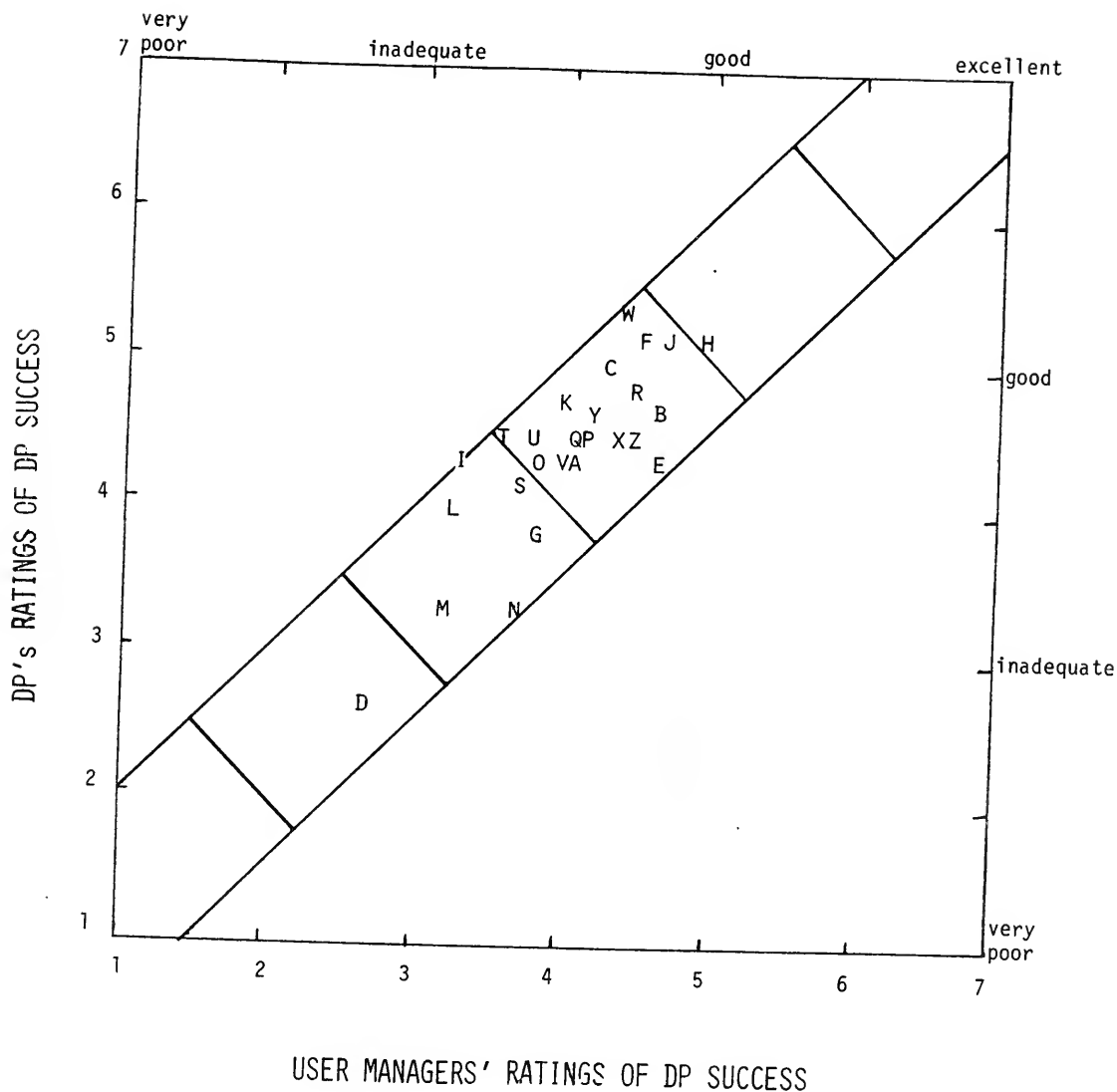Comparison of Success by Group of Criteria

Firm 5 and Firm 3

Firm 5 (white bars) users' rating of DP success = 4.8
Firm 3 (hatched bars) users' rating of DP success = 3.2

EXHIBIT 6

COMPARISON OF DP AND USERS RATINGS OF SUCCESS

EXHIBIT 7
COMPARISON OF DP ᴀɴᴅ USERS RATINGS OF IMPORTANCE
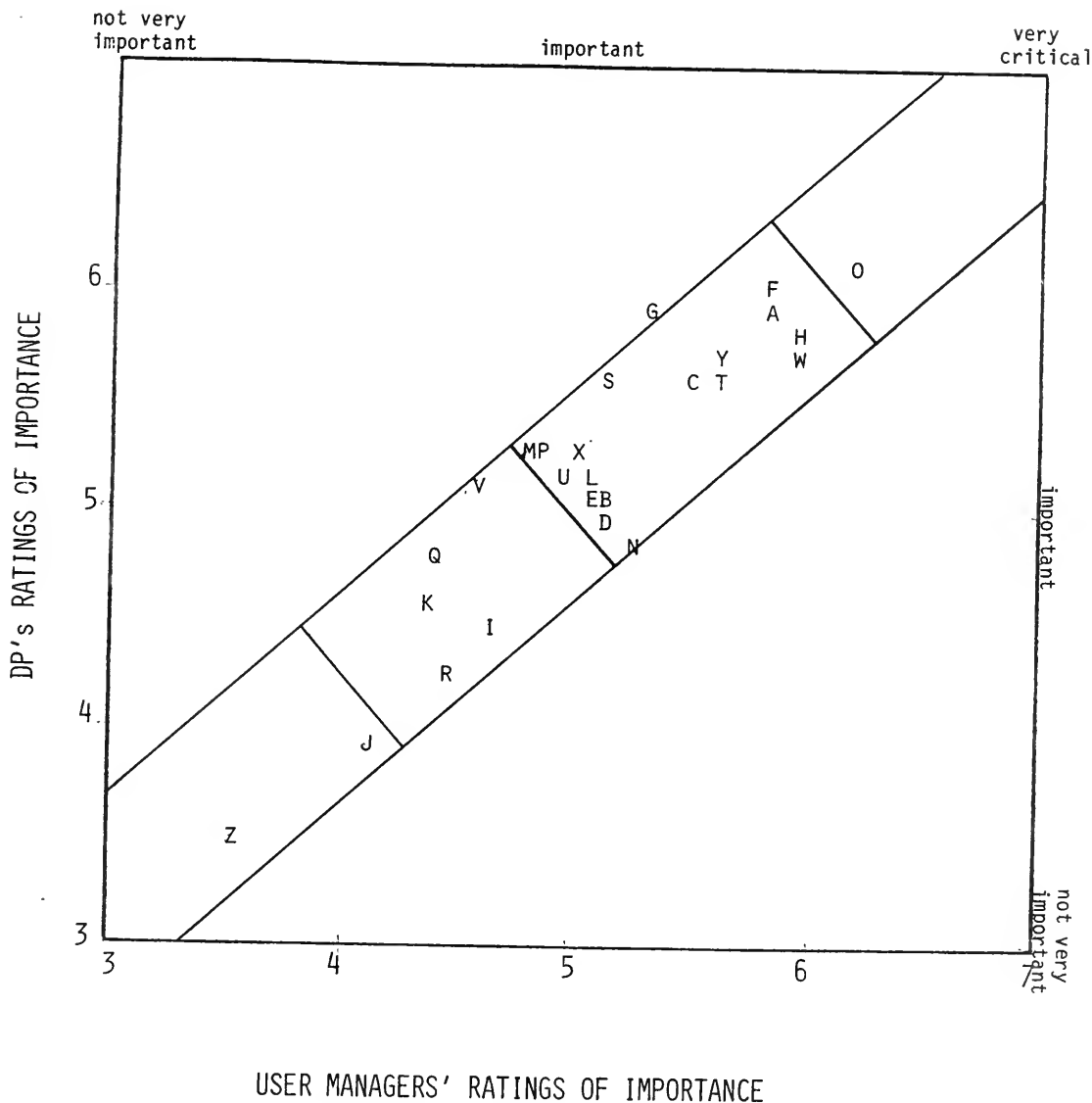

USER MANAGERS' RATINGS OF IMPORTANCE

EXHIBIT 8

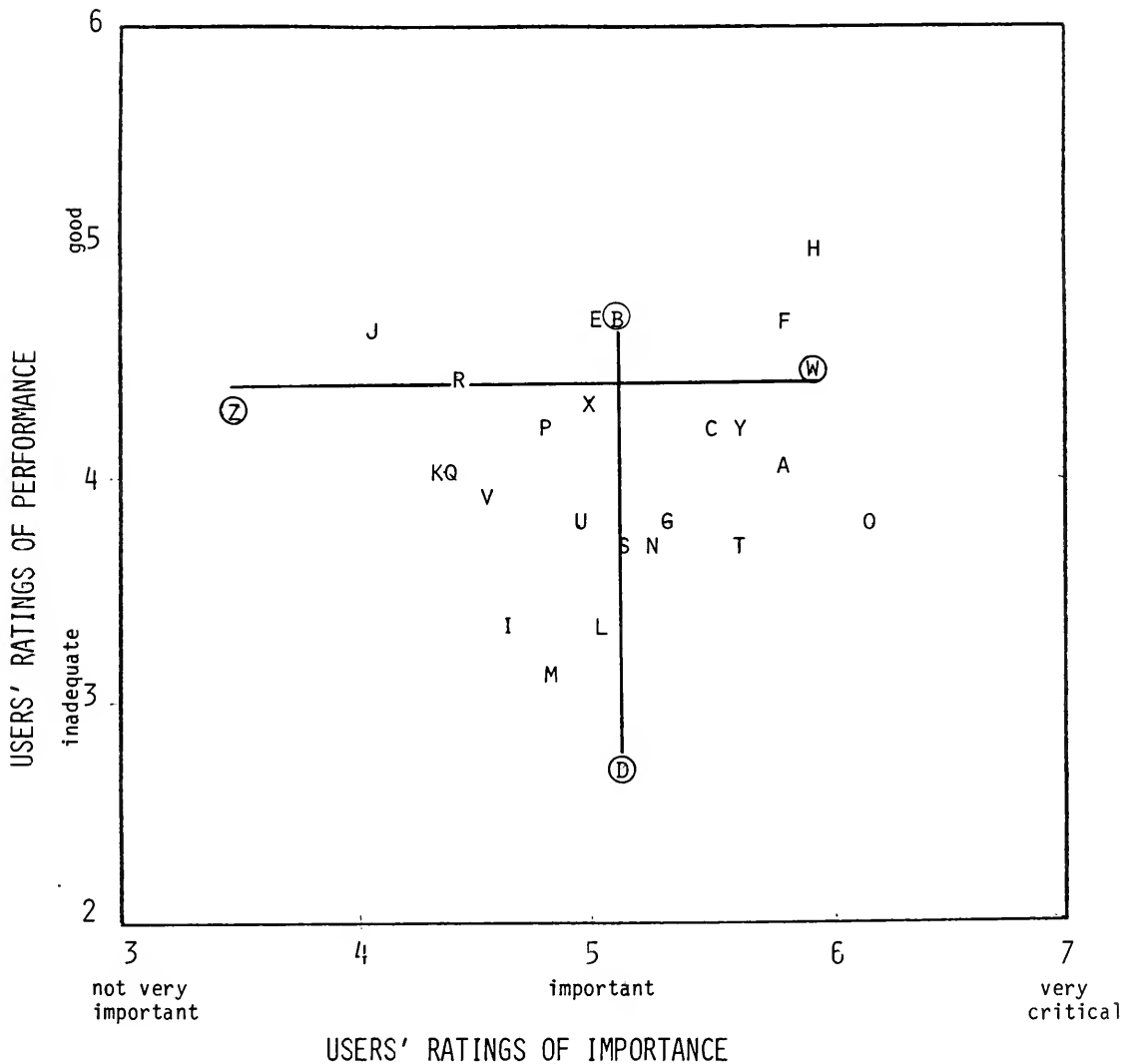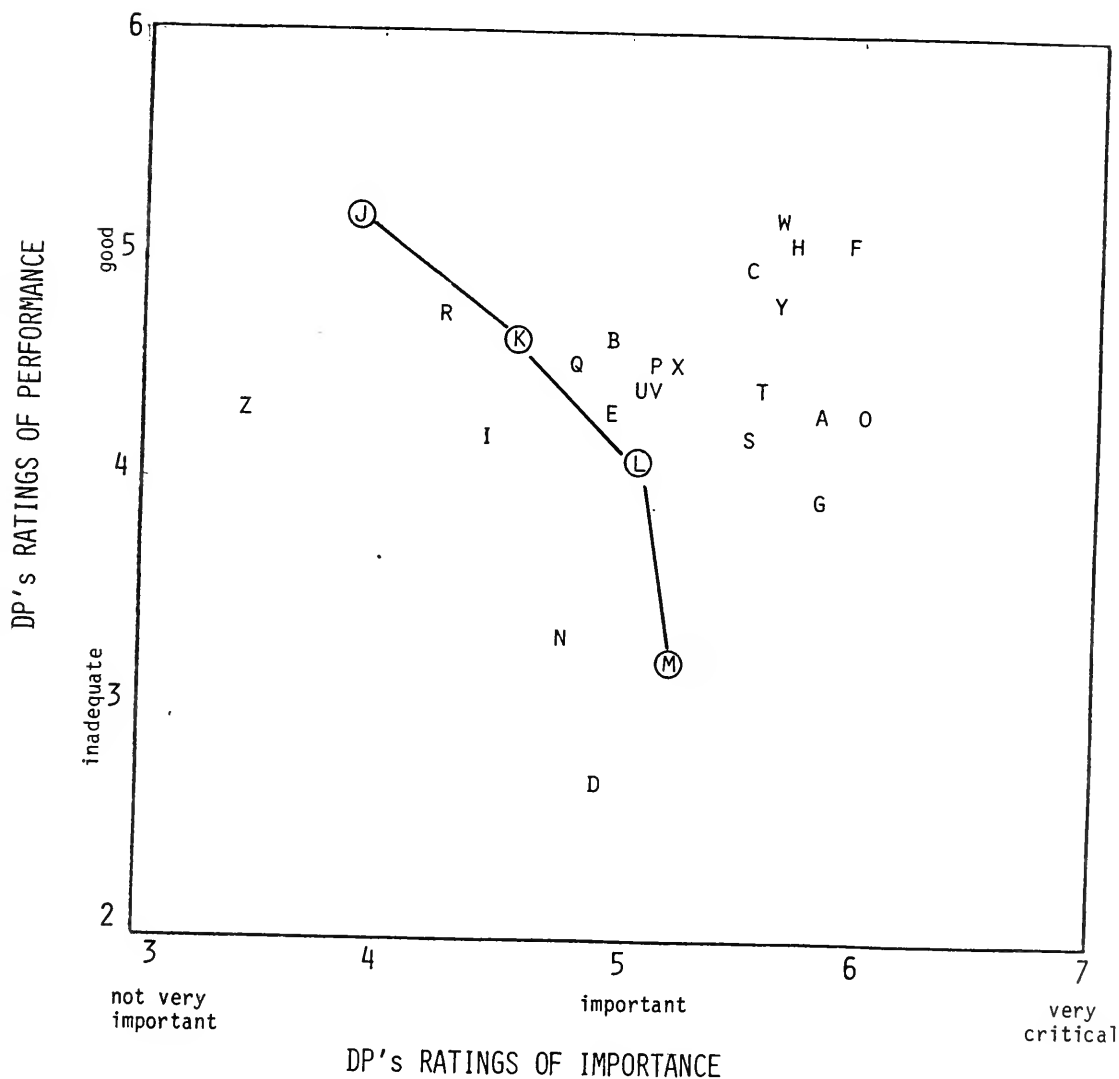## COMPARISON OF USERS' RATINGS OF IMPORTANCE AND PERFORMANCE

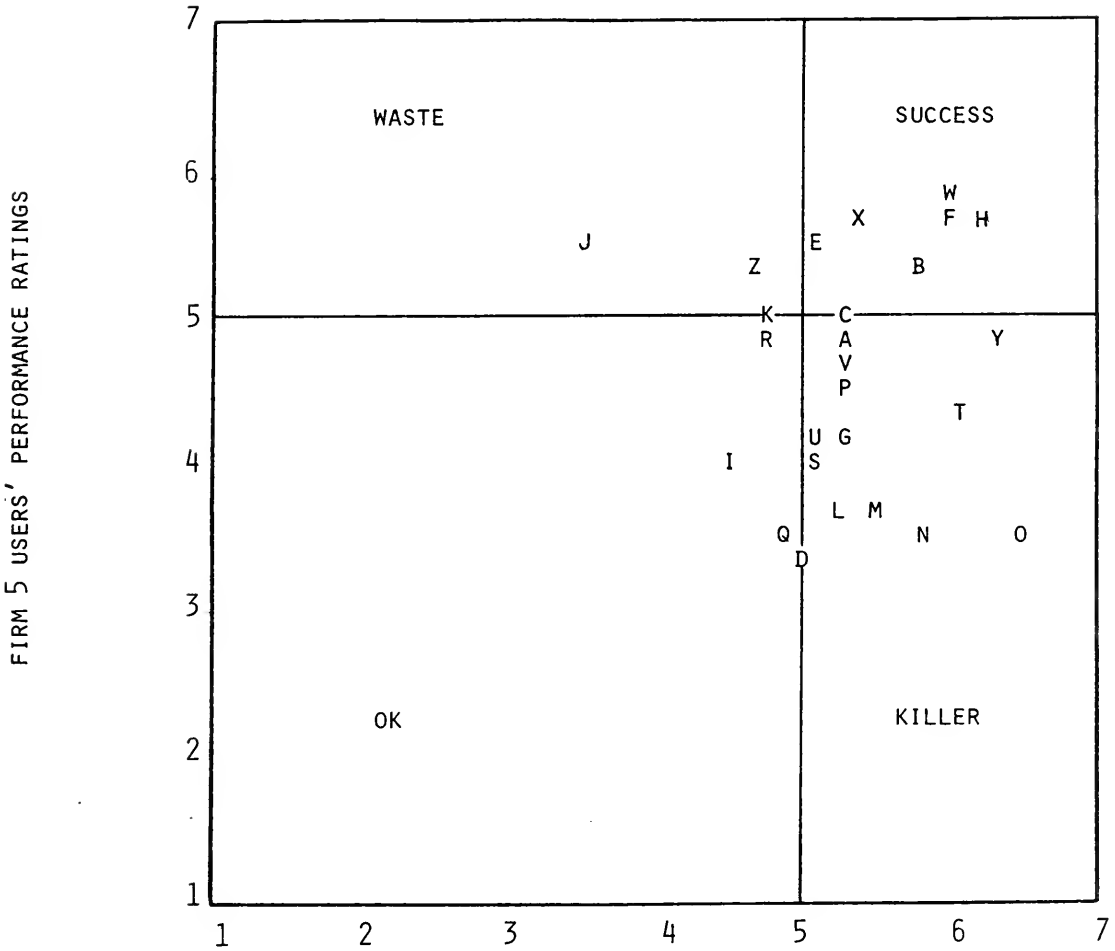EXHIBIT 9

COMPARISON OF DP's RATINGS OF IMPORTANCE AND PERFORMANCE

EXHIBIT 10

COMPARISON OF FIRM 5 USERS' IMPORTANCE AND PERFORMANCE

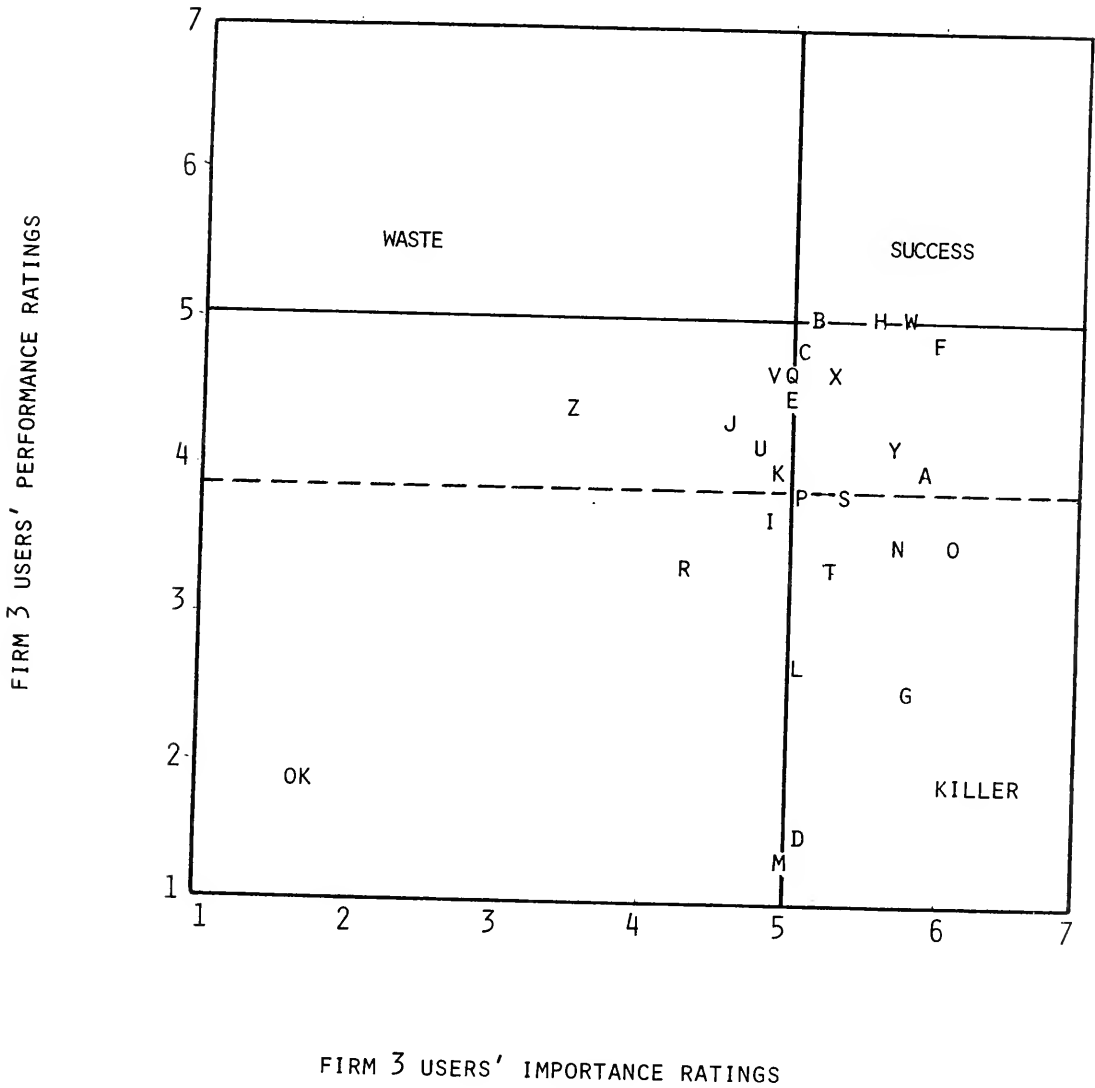FIRM 5 USERS' PERFORMANCE RATINGS

WASTE

SUCCESS

W
X   F   H
E
Z   B
J
K
C
R   A   Y
V
P
T
U G
I   S
L M
Q   N   O
D

OK

KILLER

1   2   3   4   5   6   7

FIRM 5 USERS' IMPORTANCE RATINGS

EXHIBIT 11

COMPARISON OF FIRM 3 USERS' IMPORTANCE AND PERFORMANCE

FIRM 3 USERS' PERFORMANCE RATINGS

WASTE

SUCCESS

B — H — W
C   F
V Q   X
E
Z   J   Y
U   A
K
P — S
I
R   N   O
T

L
G

OK

KILLER

D
M

FIRM 3 USERS' IMPORTANCE RATINGS

EXHIBIT 12

IMPORTANCE - PERFORMANCE GAPS FOR DP AND USERS

DP (IMPORTANCE - PERFORMANCE)

USERS (IMPORTANCE - PERFORMANCE)